

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) ~~An optical bio-disc, comprising:~~
a substantially circular substrate having a center and an outer edge;
an active layer associated with said substrate;
a membrane associated with said active layer, wherein said membrane comprises a fluidic circuit; and
~~a strand of DNA including a reactive group which has an affinity for said active layer so that said reactive group attaches to said active layer to immobilize said strand of DNA in a target zone disposed between said center and said outer edge~~
capture DNA immobilized on said active layer and in fluid communication with said fluidic circuit.
2. (Currently Amended) ~~The optical bio-disc according to claim 1 wherein said strand of capture DNA is a single strand of DNA.~~
3. (Currently Amended) ~~The optical bio-disc according to claim 1 wherein said strand of capture DNA includes a double strand of DNA.~~
4. (Currently Amended) ~~The optical bio-disc according to any one of claims 1, 2, or 3 wherein said active layer is formed from a modified polystyrene.~~
5. (Currently Amended) ~~The optical bio-disc according to claim 4 wherein said modified polystyrene is polystyrene-co-maleic anhydride.~~
- 6.-10. (Cancelled)
11. (Currently Amended) ~~An optical bio-disc, comprising:~~
a substrate having a tracking groove formed therein;
a reflective layer formed on at least a portion of said substrate so that an incident beam of electromagnetic energy may track along said groove
an active layer associated with said substrate ~~reflective layer; and~~
~~a strand of DNA including a reactive group which has an affinity for said active layer so that said reactive group attaches to said active layer to immobilize said strand of DNA~~
a membrane associated with said reflective layer, wherein said membrane comprises a fluidic circuit; and

a strand of DNA immobilized on said active layer and in fluid communication with said fluidic circuit.

12. (Currently Amended) The ~~optical~~ bio-disc according to claim 11 wherein said strand of DNA is a single strand of DNA.

13. (Currently Amended) The ~~optical~~ bio-disc according to claim 11 wherein said strand of DNA includes a double strand of DNA.

14. (Currently Amended) The ~~optical~~ bio-disc according to any one of claims 11, 12, or 13 wherein said active layer is formed from a modified polystyrene.

15. (Currently Amended) The ~~optical~~ bio-disc according to claim 14 wherein said modified polystyrene is polystyrene-co-maleic anhydride.

16. (Currently Amended) An ~~optical~~ bio-disc, comprising:
a substantially circular substrate having a center and an outer edge;
an active layer associated with said substrate;
a membrane comprising a fluidic circuit and associated with said active layer;
a strand of DNA immobilized on said active layer and in fluid communication with said fluidic circuit; and
~~a strand of DNA including an amino group which has an affinity for said active layer so that said amino group attaches to said active layer to immobilize said strand of DNA in a target zone disposed between said center and said outer edge~~
a reflective surface associated with said membrane.

17. (Currently Amended) The ~~optical~~ bio-disc according to claim 16 wherein said strand of DNA is a single strand of DNA.

18. (Currently Amended) The ~~optical~~ bio-disc according to claim 16 wherein said strand of DNA includes a double strand of DNA.

19. (Currently Amended) The ~~optical~~ bio-disc according to any one of claims 16, 17, or 18 wherein said active layer is formed from a modified polystyrene.

20. (Currently Amended) The ~~optical~~ bio-disc according to claim 19 wherein said modified polystyrene is polystyrene-co-maleic anhydride.

21. (Currently Amended) An ~~optical~~ bio-disc, comprising:
a substrate having encoded information associated therewith, said encoded information being readable by a disc drive assembly to control rotation of the disc;

a target zone associated with said substrate, said target zone disposed at a predetermined location relative to said substrate;

an active layer associated with said target zone; ~~and~~

a membrane comprising a fluidic circuit and associated with said active layer;

~~a strand of DNA including a reactive group which attaches to said active layer so that when said substrate is rotated, said reactive group remains attached to~~ immobilized on said active layer ~~to thereby maintain a number of said strands of DNA and~~ within said target zone.

22. (Currently Amended) The ~~optical~~ bio-disc according to claim 21 wherein said strand of DNA is a single strand of DNA.

23. (Currently Amended) The ~~optical~~ bio-disc according to claim 21 wherein said strand of DNA includes a double strand of DNA.

24. (Currently Amended) The ~~optical~~ bio-disc according to any one of claims 21, 22, or 23 wherein said active layer is formed from a modified polystyrene.

25. (Currently Amended) The ~~optical~~ bio-disc according to claim 23 wherein said modified polystyrene is polystyrene-co-maleic anhydride.

26. (Currently Amended) An ~~optical~~ bio-disc for testing for the presence of a target-DNA in a DNA sample, said bio-disc comprising:

a substrate having a center and an outer edge, and having encoded information associated therewith, said encoded information being readable by a disc drive assembly to control rotation of the disc;

a target zone associated with said substrate, said target zone disposed at a predetermined location relative to said center of said substrate;

an active layer associated with said target zone;

~~a strand of capture-DNA including a reactive group that attaches to said active layer to immobilize said strand of capture-DNA within~~ immobilized on said active layer and detectable through said target zone, wherein said capture-DNA is complimentary to said target-DNA; and

a flow channel in fluid communication with said target zone active layer and adapted to receive a sample of said target-DNA;

~~a plurality of reporters deposited in said flow channel, each of said reporters having attached thereto a plurality of strands of signal DNA, said capture DNA and said signal DNA being non-complementary; and~~

~~an input site in fluid communication with said flow channel, said input site implemented to receive a DNA sample to be tested for the presence of a target DNA that is complementary to said capture DNA and said signal DNA, so that when said DNA sample is deposited in said flow channel, said DNA sample and said reporters move into said target zone and hybridization occurs between said target DNA and said capture DNA, and said target DNA and said signal DNA thereby placing said reporters in said target zone when target DNA is present in the DNA sample.~~

27. (Currently Amended) An optical bio-disc for testing for the presence of a target-DNA in a DNA sample, said bio-disc comprising:

a substrate having a center and encoded information associated therewith, said encoded information being readable by a disc drive assembly to control rotation of the disc;

a target zone associated with said substrate, said target zone disposed at a predetermined location relative to said center of said substrate;

an active layer associated with said target zone;

a strand of capture-DNA including a reactive group that attaches to said active layer to immobilize said strand of capture DNA within immobilized on said active layer and viewable through said target zone, wherein said capture-DNA is adapted to bind with said target-DNA;

a flow channel formed from a membrane and in fluid communication with said target-zoneactive layer; and

~~a plurality of reporters deposited in said flow channel, each of said reporters including a binder that has an affinity for a target DNA that is complementary to said capture DNA; and~~

~~an input site in fluid communication with said flow channel, said input site implemented to receive a DNA sample to be tested for the presence of said target-DNA; so that when said DNA sample is deposited in said flow channel, said DNA sample and said reporters move into said target zone and hybridization occurs between said target-~~

~~DNA and said capture DNA to thereby place said reporters in said target zone when target DNA is present in the DNA sample.~~

28. (Currently Amended) ~~An optical bio-disc for determining the presence of a target-DNA in a test sample, said bio-disc comprising:~~

~~a substrate having a center and an outer edge, and having encoded information associated therewith, said encoded information being readable by a disc drive assembly to control rotation of the disc;~~

~~a target zone associated with said substrate, said target zone disposed at a predetermined location relative to said center of said substrate;~~

~~an active layer associated with said target zone;~~

~~a strand of capture-DNA including a reactive group that attaches to said active layer to immobilize immobilized on said active layer and complimentary to said target-DNA, wherein said strand of capture-DNA is detectable through said strand of capture-DNA within said target zone;~~

~~a membrane comprising a flow channel, wherein said flow channel is in fluid communication with said target zone active layer;~~

~~a reflective surface in communication with said membrane;~~

~~a cap portion in communication with said reflective surface; and~~

~~an input site disposed in said cap and in fluid communication with said flow channel, said input site implemented to receive a test sample including sample DNA and a plurality of reporters, each of said reporters having attached thereto a plurality of strands of signal DNA, said capture DNA and said signal DNA being non-complementary, said sample DNA to be tested for the presence of a target DNA that is complementary to said capture DNA and said signal DNA so that when said test sample is deposited in said flow channel, said test sample moves into said target zone and hybridization occurs between any target DNA and said capture DNA to thereby maintain said reporters in said target zone when target DNA is present in the sample DNA.~~

29.-42. (Cancelled)

43. (Currently Amended) ~~An optical~~ bio-disc, comprising:

a substrate having a center and an outer edge, said substrate forming a distal layer of the bio-disc, said substrate having a top surface and a bottom surface relative to an interrogation beam of electromagnetic energy directed from a disc drive;

a reflective layer formed on the bottom surface of said substrate, said reflective layer comprising openings defining a plurality of target zones;

an active layer associated with said substrate and said reflective layer; and

a strand of capture DNA immobilized on said active layer, and adjacent said target zones~~including a reactive group which has an affinity for said active layer so that said reactive group attaches to said active layer to immobilize said strand of DNA in a target zone disposed between said center and said outer edge.~~

44. (Currently Amended) ~~The optical~~ bio-disc according to claim 43 wherein said strand of capture DNA is complementary to a strand of target DNA which includes a reporter that is detectable by said interrogation beam.

45. (Currently Amended) ~~The optical~~ bio-disc according to either claim 43 or 44 wherein said strand of capture DNA is a single strand of DNA.

46. (Currently Amended) ~~The optical~~ bio-disc according to either claim 43 or 44 wherein said strand of capture DNA includes a double strand of DNA.

47. (Currently Amended) ~~The optical~~ bio-disc according to either claim 43 or 44 wherein said active layer is formed from a modified polystyrene.

48. (Currently Amended) ~~The optical~~ bio-disc according to claim 47 wherein said modified polystyrene is polystyrene-co-maleic anhydride.

49. (Currently Amended) ~~The optical~~ bio-disc according to either claim 43 or 44 wherein said reflective layer is interposed between said substrate and said active layer.

50.-69. (Cancelled)

70. (New) A bio-disc for detecting the binding of target-DNA to capture-DNA, comprising:

a substantially circular substrate adapted to transmit an interrogation beam from an optical drive;

a reflective layer associated with said substrate, wherein said reflective layer is adapted to reflect said interrogation beam;

a plurality of target zones disposed in said reflective layer, wherein said target zones permit said interrogation beam to pass through said reflective layer; and

an active layer associated with said reflective layer and said target zones, wherein said active layer comprises immobilized capture-DNA positioned to be contacted by said interrogation beam as it passes through said target zones.

71. (New) The bio-disc of Claim 70, further comprising a fluidic circuit associated with said active layer.

72. (New) The bio-disc of Claim 71, wherein said fluidic circuit is formed from a membrane associated with said active layer.

73. (New) The bio-disc of Claim 72, wherein said membrane is an adhesive membrane.

74. (New) The bio-disc of Claim 71, wherein said fluidic circuit comprises a flow channel and a return channel.

75. (New) The bio-disc of Claim 74, wherein said flow channel and said return channel form a "U" shape.

76. (New) The bio-disc of Claim 71, further comprising a cap portion associated with said active layer, wherein said cap portion provides an inlet port to said fluidic circuit.

77. (New) The bio-disc of Claim 76, further comprising a second reflective layer disposed between said active layer and said cap portion.

78. (New) A bio-disc for detecting the binding of target-DNA to capture-DNA, comprising:

a substantially circular substrate configured to be read by an optical drive; and
a plurality of flow channels associated with said substrate, wherein said flow channels are divided by a break-away retaining wall configured to break when said bio-disc rotates at a predetermined speed in said optical drive.

79. (New) The bio-disc of Claim 78, further comprising DNA immobilized on an active layer associated with said flow channels.

80. (New) The bio-disc of Claim 78, wherein said flow channels are formed from a membrane.

81. (New) The bio-disc of Claim 78, further comprising a cap associated with said active layer, wherein said cap comprises inlet ports configured to receive fluid into said flow channels.

82. (New) The bio-disc of Claim 78, further comprising:

a reflective layer associated with said substrate, wherein said reflective layer is adapted to reflect said interrogation beam from said optical disk;

a plurality of target zones disposed in said reflective layer, wherein said target zones permit said interrogation beam to pass through said reflective layer to said active layer.